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Title of the Research Work :

IMPACT OF VARIABLES OF CLIMATE CHANGE ON FOOD SECURITY IN WESTERN RAJASTHAN : (A CASE STUDY OF JODHPUR DISTRICT)

जलवायु परिवर्तन के घटकों का पश्चिमी राजस्थान में खाद्य सुरक्षा पर प्रभाव (जोधपुर जिले का विशेष अध्ययन)

Agriculture typically plays a larger role in developing economies than in the developed world. For example, agriculture in India makes up roughly 20% of GDP and provides nearly 52% of employment (as compared to 1% of GDP and 2% of employment for the US), with the majority of agricultural workers drawn from proper segments of the population (FAO, 2006). Furthermore, it is reasonable to expect that farmers in developing countries may be less able to adapt to climate change due to credit constraints or less access to adaptation technology. However, the majority of the literature on the impact of climate change has focused on developed countries, in particular the US, presumably for reason of data availability. Most research in developing countries has followed the production function approach, finding alarmingly large possible impacts (Cruz et al, 2007). A true Ricardian study world be difficult to carry out in a developing country context, because land markets are less likely to be well-functioning and data on land prices are not generally available. Instead, a semi-Ricardian approach has used data on average profits instead-the idea is that the land price, if it were available, would just be the present discounted value of profits. The major developing country semi-Ricardian studies, of India and Brazil, found significant negative effects, with a moderate climate change scenario (an increase of 2.0^0 C in mean temperature and seven percent increase in precipitation) leading to losses on the order of 10% of agricultural profits (Sanghi et. al., 1998b, 1997).

This study applies the panel data approach to food security in Rajasthan, using a panel of Jodhpur district covering 1960-1991. The basic estimation strategy, following Deschenes and Greenstone (2007), is to regress yearly district-level agricultural outcomes (in this case, yields) on yearly climate measures (temperature and precipitation) and district fixed effects. The resulting weather parameter estimates, then, are identified from district-specific deviations in yearly weather from the district mean climate. since year-to-year fluctuations in the weather are essentially random and therefore independent of other, unobserved determinants of agricultural outcomes, these panel estimates should be free of the omitted variables problems associated with the hedonic approach. The use of district-level data is important to obtain adequate within-year climate variation, thereby distinguishing climate impacts from other national-level yearly shocks. I also include smooth

regional time trends so that the effect of a slowly warming climate over the second half of the twentieth century is not confounded with improvements in agricultural productivity over the same period. The predicted mean impact of climate change is then calculated as a linear combination of the estimated weather parameters and the predicted changes in climate.

The purpose of this review is to provide a critical overview of the now extensive literature on the tightly coupled relationship between climate change and food systems. In particular, it seeks to draw attention to wider issues of food systems beyond food production, to highlight the distribution of climate-related impacts on food security across sectors of global society, and to set out the opportunities and challenges in food systems for integrating the options for mitigation, adaptation, and food security.

The drivers and patterns of observed and predicted climate change are well reviewed (9). A useful distinction can be drawn between long-term (decadal) trends and near-term increases in variability in climate (10), though the same radiative forcing drives both. In the absence of complete mitigation, society needs, in the long term, to adapt to gradual changes in the means and distributions of temperatures and precipitation. Depending on the speed and direction of these trends, incremental or transformative adaptation is needed (10). Most immediately, climate change is being experienced as increasing temporal and spatial variability in temperature, precipitation, and winds, particularly the incidence and magnitude of extreme events. The types of extreme events that are likely to increase include the frequency and intensity of heat waves, frequency of heavy precipitation events and associated floods, intensity of tropical cyclone events, and incidence of extremely high sea levels owing to storm surges. Longer dry spells in some areas, and the area affected by drought each year, are likely to increase. Other types of extreme events, such as cold spells and frosts, will decrease in frequency and intensity (9). In the short term, therefore, increasing climate variability has more impact than longer-term change in mean values, and the appropriate focus of adaptation is climate risk management (11). The need for this focus will continue even though the need to address changes in mean values over the longer term will increase.

IMPORTANCE OF THE STUDY

The importance of the research is limited to identification and profiling of research institution working on climate change and food security in Rajasthan. The study does not discuss the science of climate change and food security as this subject is better address elsewhere by the social group of the area.

All four dimensions of food security namely the availability, accessibility, utilization and system stability are affected by climate change. Assessment of the impact of climate change on the food and agriculture sector have focused on the availability aspect namely crop failure and decline in the crop yields. The accessibility and the utilization aspect of food security depend on the socio-cultural condition including affordability, food preferences, nutritional value. For a populous country like India which is affected by climate change in many ways the threats to food security multidimensional. A holistic analysis of the food systems along with study of the policies of the state to address the issue will be carried out

AREA OF THE STUDY

The state of Rajasthan situated in the western part of India, faces severe water scarcity, has poor rainfall and is classified as arid/semi-arid region. Administratively, the state comprises of 33 districts, 39753 inhabited village 249 Panchayat Samities and 9168 Gram Panchayats. Geographically deserts in the state constitute a large share of landmass. The total population of the state is about 56.5 million. The population density of the state is 165 per sq. km. and it varies from as low as 13 per sq. km. in Jaisalmer district to as high as 471 per sq.km.

OBJECTIVES

The objective of this research is to provide a preliminary assessment of the impacts of climate change on food security in western region examining the scope of the issue in this region, comparing it with experiences in other vulnerable regions and providing a baseline for action. The information gathered in the study (research) will provide the background for a action plan on food security proposed for 2012-2014, which will bring together different interests in the field of food security to examine the issue in greater detail with the aim of identifying action to

help communities and government respond to the effects of climate change on food security. The main objectives of this research study are as under :

(1) To identify the impact of climate change on natural resources availability in area.

(2) To assess the impact of climate change on food security, livelihood and poverty.

(3) To propose adaptation and eco system resilience strategies including natural resources management and crop improvement.

(4) To examine policy options and institutional set up to ensure enabling environments to cope with climate change impacts.

HYPOTHESIS

The research aims to find out the following two questions regarding the current state of food security in the western Rajasthan. These hypothesis may also provide the basis for western Rajasthan food security study.

(1) Impact of variables of climate change has affected already stressed environments imparted social, geographical, demographic and migration patterns and its concomitant response planning and has affected the people themselves, their cultivated land, livestock, social groups and food security.

(2) There is a gap between social group demands, stakeholders and governmental intervention to identify the basic need of food security

METHODOLOGY

The research study broadly contained the following steps.

(1) Participatory research approach :- The participatory research approach emerged in the field of development studies. These approaches are also called Participatory Rural Appraisal. This approach involve local people actively participating in the planning, monitoring and evaluation of development programme.

(2) Household survey :- As household survey can be perceived as “links” between individual perspectives and actions, and regional or even national structures, they are the ideal targets of the HH survey. The HH survey includes precise

questions about different topics, in this case about rainfall, food security and migration. Interviewers and interviewees meet in a face-to-face situation.

(3) Expert Interviews :- Interviews of this type are held with different experts. Those at the national level as well as the local and district levels.

(4) Field visit- To understand the perception of the local community and their cultural practices in order to suggest programmatically feasible 'No regret' adaptation strategies field visit will conducted to selected district, collecting secondary data on climate data/food production etc. and analysis and conducting stakeholders workshops to discuss and finalize results. Study scoping through village visits and stakeholder discussion. Developing field testing, and finalizing survey instruments. Conducting actual surveys and participating expenditure tracking.

(5) Statistical method- Mean, mode, medium, Co-relation, SD (Standard Deviation), regression, t-test, f-test, climate variability, rainfall trend analysis, uncertainties etc.

(6) Map, Diagrams, Photographs & other analytical methods.

Food security is a vast and complete topic, standing at the intersection of many disciplines. This research will briefly touch upon the myriad of influencing factors, examining the impacts of climate change on food security in the western Rajasthan and how it compares to other global regions, and consider options for maintaining food security.